AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions and listings of claims in the application:

Listing of Claims:

Claim 1 (Previously Presented) A method for welding and monitoring the quality of a laser weld being formed between first and second pieces of plastic material comprising the steps of:

positioning the first and second pieces to abut each other, the second plastic piece being transmissive to a laser beam;

heating the first and second pieces at their location of abutment by directing the laser beam to form a pool of material at the location of abutment which pool of material forms a weld between the pieces;

simultaneous with said heating step, obtaining a thermal image as the weld is being formed by collecting infrared radiation passing through the second piece of material from the weld and the pool of material;

analyzing the obtained thermal image for characteristics indicative of an acceptable weld being formed;

providing a feedback signal to a weld controller in response to determining that a characteristic fails to meet an associated criterion; and

modifying the heating in response to said feedback signal.

Claim 2 (Original) The method of claim 1 wherein the step of obtaining a thermal image of the weld being formed further includes the step of:

obtaining a thermal image that includes, in its entirety, a weld pool that results in the weld.

Claim 3 (Original) The method of claim 2 wherein the step of obtaining a thermal image that includes the weld pool in its entirety further includes the step of:

positioning an infrared detector that is configured to detect infrared radiation having a wavelength that passes through the second piece of material on a side of the second piece of material opposite the first piece of material and in a location in which the weld pool in its entirety is within a field of view of the infrared detector.

Claim 4 (Original) The method of claim 2 wherein the step of analyzing the obtained thermal image for characteristics indicative of a properly formed weld includes the steps of:

determining a temperature of each portion of the weld pool; and

comparing the determined temperature of each portion of the weld pool with a threshold temperature range.

Claim 5 (Original) The method of claim 4 wherein the step of comparing the determined temperature of each portion of the weld pool with a threshold temperature range further includes the steps of:

determining a time at which the thermal image was obtained; and

comparing the determined temperature of each portion of the weld pool with a threshold temperature range that is associated with the determined time to

determine whether the determined temperatures are within the associated threshold temperature range.

Claim 6 (Original) The method of claim 5 further including the step of:

providing a feedback signal to a weld controller in response to determining that a determined temperature is outside of the associated threshold temperature range.

Claim 7 (Original) The method of claim 2 wherein the step of analyzing the obtained thermal image for characteristics indicative of a properly formed weld includes the steps of:

determining a width of the weld pool at all locations along a path of the weld pool; and

comparing the determined widths to a threshold width range to determine whether the determined widths are within the threshold width range.

Claim 8 (Original) The method of claim 7 further including the step of:

providing a feedback signal to a weld controller in response to determining that a determined width is outside of the threshold width range.

Claims 9-11 (Canceled)

Claim 12 (Previously Presented) The method of claim 1 further including the step of:

providing an alarm signal to an alarm device in response to determining that a characteristic fails to meet the associated criterion.

Claim 13 (Previously Presented) A method for welding and monitoring the quality of a laser weld being formed between first and second pieces of plastic material comprising the steps of:

positioning the first and second plastic pieces to abut each other, the second plastic piece being transmissive to a laser beam;

heating the first and second plastic pieces at their location of abutment by directing the laser beam over the path of a weld pool multiple times to form a pool of material at their location of abutment which pool of material forms a weld between the pieces;

determining a range of wavelengths of infrared radiation that will pass through the second piece of material;

positioning an infrared detector that is configured to detect infrared radiation within the determined range of wavelengths on a side of the second piece of material opposite the first piece of material;

simultaneous with said heating step, obtaining a thermal image as the weld is being formed between the first and second pieces of material by collecting infrared radiation within the determined range of wavelengths from the weld and the pool of material; and

analyzing the obtained thermal image for characteristics indicative of an acceptable weld being formed.

Claim 14 (Previously Presented) The method of claim 13 wherein the step of obtaining a thermal image of the weld being formed further includes the step of:

obtaining a thermal image that includes, in its entirety, the weld pool that results in the weld.

Claim 15 (Original) The method of claim 14 wherein the step of analyzing the obtained thermal image for characteristics indicative of a properly formed weld includes the steps of:

determining a temperature of each portion of the weld pool; and

comparing the determined temperature of each portion of the weld pool with a threshold temperature range.

Claim 16 (Original) The method of claim 15 wherein the step of comparing the determined temperature of each portion of the weld pool with a threshold temperature range further includes the steps of:

determining a time at which the thermal image was obtained; and

comparing the determined temperature of each portion of the weld pool with a threshold temperature range that is associated with the determined time to determine whether the determined temperatures are within the associated threshold temperature range.

Claim 17 (Original) The method of claim 16 further including the step of:

providing a feedback signal to a weld controller in response to determining that a determined temperature is outside of the associated threshold temperature range.

Claim 18 (Previously Presented) The method of claim 14 wherein the step of analyzing the obtained thermal image for characteristics indicative of a properly formed weld includes the steps of:

determining a width of the weld pool at all locations along the path of the weld pool; and

comparing the determined widths to a threshold width range to determine whether the determined widths are within the threshold width range.

Claim 19 (Original) The method of claim 18 further including the step of:

providing a feedback signal to a weld controller in response to determining that a determined width is outside of the threshold width range.

Claim 20 (Original) The method of claim 14 wherein the step of analyzing the obtained thermal image for characteristics indicative of a properly formed weld includes the step of:

analyzing the weld pool in its entirety for indications of a void in the weld pool.

Claim 21 (Original) The method of claim 20 further including the step of:

providing a feedback signal to a weld controller in response to determining that a void exists in the weld pool.

Claims 22-23 (Cancelled)

Claim 24 (Previously Presented) The method of claim 13 wherein the step of obtaining the thermal image of the weld being formed includes the step of filtering the infrared radiation to block out the electromagnetic energy having a first wavelength that is used in heating the first and second pieces at their location of abutment to form a pool of material and a weld between the first and second pieces.

Claim 25 (Currently Amended) The method of claim 1 wherein the step of heating the first and second pieces at their location of abutment to form a pool of material at the location of abutment which pool of material forms a weld between the pieces is performed by ~~moving~~ directing the laser beam over the path of the weld pool multiple times; and said modifying occurs during ~~moving~~ directing of the laser beam over the path during at least one of said multiple times.

Claim 26 (Previously Presented) The method of claim 1 wherein the first piece absorbs the heat from the laser beam and heats the second piece.

Claim 27 (Previously Presented) The method of claim 25 wherein said modifying is performed by moving the laser beam over the path at different speeds.

Claim 28 (Previously Presented) The method of claim 1 wherein the step of obtaining the thermal image as the weld is being formed does not include collecting the wavelength of the laser beam used to heat the first and second pieces of plastic material at their location of abutment.

Claim 29 (Previously Presented) The method of claim 1 wherein said laser beam is reflected by a reflective device onto the first and second pieces at their location of abutment.

Claim 30 (Previously Presented) The method of claim 29 including the step of positioning an infrared camera having a field of view to obtain the thermal image, wherein the reflective device is outside the field of view of the infrared camera.

Claim 31 (Previously Presented) The method of claim 1, including the step of, simultaneous with said heating step, obtaining another thermal image as the weld is being formed by collecting infrared radiation passing through the second piece of material from the weld and the pool of material, each of the thermal image and the other thermal image including, in its entirety, a weld pool that results in the weld.

Claim 32 (Previously Presented) The method of claim 31 including the steps of analyzing the obtained other thermal image for characteristics indicative of an acceptable weld being formed;

providing another feedback signal to a weld controller in response to determining that a characteristic from analyzing the other thermal image fails to meet an associated criterion; and

modifying the heating in response to the other feedback signal.

Claim 33 (New) The method of claim 1, including the steps of, simultaneous with said heating step, continuously obtaining a plurality of thermal images as the weld is being formed by collecting infrared radiation passing through the second piece of material from the weld and the pool of material, each of said thermal images including, in its entirety, a weld pool that results in the weld; analyzing the obtained thermal image for characterisitics indicative of an acceptable weld being formed; determining that weld is formed; and stopping the obtaining of any thermal images of the weld after the weld is formed.

Claim 34 (New) The method of claim 13, including the steps of, simultaneous with said heating step, continuously obtaining a plurality of thermal images as the weld is being formed by collecting infrared radiation passing through the second piece of material from the weld and the pool of material, each of said thermal images including, in its entirety, a weld pool that results in the weld; analyzing the obtained thermal image for characteristics indicative of an acceptable weld being formed; determining that weld is formed; and stopping the obtaining of any thermal images of the weld after the weld is formed.

Claim 35 (New) The method of claim 25, wherein the path is a closed-curved shape, and wherein the step of heating the first and second pieces at their location of abutment to form a pool of material at the location of abutment which pool of material forms a weld between the pieces is performed by directing the laser beam around the path of the weld pool multiple times; and said modifying occurs during directing of the laser beam around the path during at least one of said multiple times.

Claim 36 (New) The method of claim 13, wherein the path is a closed-curved shape, and wherein the step of heating the first and second plastic pieces at their location of abutment is performed by directing the laser beam around the path of a weld pool multiple times to form a pool of material at their location of abutment which pool of material forms a weld between the pieces.